# EXHIBIT 1



### United States Public Health Service Region Vill

1961 Stout Street, Room 498 Denver, Colorado 80294-3538

August 1, 2000

Dr. Linda Rosenstock, Director National Institute for Occupational Safety & Health Hubert H. Humphrey Building Room 715H 200 Independence Ave., S.W. Washington, DC 20201

Dear Dr. Rosenstock.

I would like to bring to your attention a significant occupational and public health concern regarding the widespread dissemination of amphibole (actinolite-framolite series) asbestos in Libby, Montana, and potentially in vermiculite end-products used throughout the country. As you may be aware, NIOSH researchers evaluated vermiculite miners, that were exposed to asbestos, in Libby, Montana in the early 1980's. NIOSH investigators found significantly elevated risks of asbestos-related malignant and non-malignant respiratory disease among these workers. Concurrently. Dr. Jim Lockey at the University of Cincinnati Identified elevated pulmonary disease among workers with much lower asbestos exposures at a facility processing Libby vermiculite in Ohio. These articles have been included for your information.

In November 1999, Libby became the focus of national attention when it was reported that a number of residents that did not work at the vermiculite mine or processing facilities were suffering from asbestos-related diseases. Subsequently, researchers from the Environmental Protection Agency (EPA), Public Health Service (PHS) Region 8, and Agency for Toxic Substances and Disease Registry (ATSDR) began intensive environmental and public health investigations of the site. Medical screening (e.g., chest x-rays, pulmonary function testing, questionnaires) is currently being conducted on 4200 former workers, family contacts, and others potentially at risk. NIOSH researchers (Dr. Robert Castellan, Dr. Leslie Stayner, Dr. Pat Sullivan, Dr. Vince Castranova, Mr. Ken Wallingford, and Mr. Ralph Zumwelde) have also been providing Intermittent technical assistance to these efforts.

One issue that has very recently come to our attention, is that end-product vermiculite insulation, and most likely other end-products, apparently contained appreciable quantities of asbestos, but were marketed, sold, and used throughout the country without adequate labeling or warnings and were commonly considered to be non-toxic (see enclosed information and video tape). Internal company documentation and recent testing of residential insulation materials, reportedly used in over one million homes, reveals that even minimal handling by workers or residents poses a substantial health risk (airborns exposures up to 150 times the current occupational standards (0.1 f/co)).

Recent discussions between the aforementioned federal partners working at the Libby site identified the pressing need for increased NIOSH participation and response to occupational health issues of concern.

Exemption (6X5)

If I can be of any further assistance to you in this matter please contact me at (303) 844-7860 or Dr. Aubrey Miller at (303) 844-7857.

Sincerely,

Hugh S. Sloan, D.S.W. Assistant Surgeon General Regional Health Administrator

Éndosures

EXHIBIT 2



### U.S. Environmental Protection Agency

### **Asbestos**

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Toxics > Asbestos > Vermiculite > Vermiculite Insulation

#### General Information

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Vermiculite

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### Asbestos in Vermiculite Insulation

The U.S. Environmental Protection Agency (EPA) offices have received a large number of phone calls from citizens concerned about vermiculite insulation in their home that might be contaminated with asbestos. EPA is gathering more information about vermiculite insulation and other products containing vermiculity. If you suspect vermiculite insulation is in your home, the safest thing is to leave the material alone. If you decide to remove or must otherwise disturb the material due to a renovation project, consult with an experienced asbestos contractor. The following information provides a common-sense approach to help you find out what kind of insulation is in your home and decide what to do if you have vermiculite insulation.

Background

Why is it a problem?
What does it look like?

What should I do if I have vermiculite insulation?

How do I find an accredited asbestos removal professional?

Where can I get more information?

#### Background

Product names cannot be used to determine if your insulation might contain asbestos. All vermiculite is likely to contain small or trace amounts of asbestos. EPA believes that a number of manufacturers produced insulation from vermiculite. One mine in the United States produced over 70 percent of the world's vermiculite before the mine was closed in 1990. Vermiculite products generated from this mine were likely to have been contaminated with asbestos.

### Why is it a problem?

If disturbed, asbestos fibers in vermiculite insulation may get into the air. These fibers can be inhaled and become trapped in the lungs where they may cause diseases such as asbestosis, lung cancer, and mesothelioma. These diseases can develop many years after exposure to asbestos.

### What does it look like?

Vermiculite is a mineral that is shaped like a small nugget, and varies in color from silver-gold to gray- brown. The asbestos fibers contained in vermiculite insulat on are generally too small to be seen without magnification. Only a trained technician using careful microscopic examination can see asbestos fibers.



Click on the image to see an enlarged picture of vermiculite.

### What should I do if I have vermiculite insulation in my home?

Look at the insulation without disturbing it. If it appears you have vermiculite insulation in your home, we recommend the following steps:

- If possible, leave the insulation undisturbed. Asbestos particles will not become airborne if the insulation is contained. If it's sealed behind wallboards and floorboards or is isolated in an attic that is vented outside, the best approach is to keep it in place.
- If you are planning to remodel or replace vermiculite insulation, have it tested first.
  - o EPA recommends using a trained and accredited professional to conduct the tests. If you decide to remove the vermiculite home insulation, use accredited, licensed asbestos removal professionalis. Use of a "negative pressure enclosure" technique will prevent asbestos fibers and dust from escaping from the attic into the rest of the home. Do not attempt to do this yourself. You could spread asbestos fibers throughout your home, putting you and your family at risk of inhaling asbestos fibers.
  - After the vermiculite insulation is removed, you may want to consider having air monitoring tests done in your attic and throughout the living areas of your home. This is to ensure that the concentration of asbestos fibers in the home is low or not present.

### How do I find an accredited asbestos removal professional?

An accredited asbestos inspector has undergone approved training and then taken examinations to be accredited. He or she will be able to take samples of the insulation, provide information on the results, and advise about additional tests or options to consider. Inspectors can be found in the Yellow Pages under "Asbestos Consulting and Testing" or "Asbestos Abatement." Ask the inspector to provide the name of the company that trained, accredited him or her. Call that company to confirm whether a particular inspector has had the required training and has up-to-date accreditation. If your State has licensing, confirm that the inspector's lice has is also current. Companies that can test the air in your home will be found under the same llstings.

### Where can I get more information?

Information can be found on the hotline and web sites below as it becomes

available.

For current information on asbestos and health related information, contact EPA's TSCA Hotline at 1-202-554-1404 or visit EPA headquarters' Asbestos web site: <a href="https://www.epa.gov/asbestos">www.epa.gov/asbestos</a>

Also visit the federal Agency for Toxic Substances and Disease Registry (ATSDF) website at <a href="https://www.atsdr.cdc.gov.fx?irdl=rhitter=">www.atsdr.cdc.gov.fx?irdl=rhitter=</a>

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Last updated on Thursday, June 20th, 2002 URL: http://www.epa.gov/asbestos/insulation.html

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# EXHIBIT 3

### CAMBRIDGE CONFIDENTIAL

TO: E. S. Wood

DATÉ:

April 19, 1977

FROM: Julie C. Yang

SUBJECTE

Tremlite Content
in ZONOLITE Products

cc. H. C. Duecker

H. A. Eschenbach

F. W. Eaton

W. R. Hanlon

R. M. Vining

B. R. Williams

C. C. Ou

J. W. Wolter

S. C. Vaughen

File: 71-046

OBJECTIVE

The objective of this study is to determine the tremplite content in a live subjective of this study is to determine the tremplites. In a fact cases, repetitious analyses were cade for product used on job-sites, so that correlation can be made with the fiber counting results.

#### MELEOD

When tremolite is determined from the product as received, in most product with tremolite was not found by conventional analytical methods. The trace amount can be determined only when intensive concentration techniques are employed. Tremolite determinations are then cade from the fractions by quantitative x-ray diffraction analysis and with the aid of petrographic microscopic examination.

1. Terra-Lite Vermiculites, Vermite, Redi-Esths and Metro-Mires

The schematic method of analysis and the results have been reported in T&A 50110 with limited distribution. They are also reported here as shown in schemes 1, 2, and 3.

2. <u>Scott Tüif Builder</u>

The method of concentration was very similar to that of Terra-Lite Version - :
lite scheme #1, except in the water flotation step. A longer scaking particle
was needed to solubilize all the nutrients present, which was approximately
50% of the total weight.

3. ZIC, Attic Fill, Masony Fill

Same concentration method as Terra-Lite (scheme #1).



E.S.Wood From: J.C.Yang April 19, 1977

Tremolitie\_Contest in ZONOLUE® Products' Page 2

#### 4. MOROKOTE

Analysis of tremplite in MONOROTE was the most difficult and time-constrains procedure. The glass fibers were screened off, plaster of Paris was allusolved in water about 50-100 times the weight, expanded vermiculite was floated off, and all the washings were combined, filtered and dried. The filter paper and the organic eatter were then burnt off; the remaining residue was x-rayed for the tremplite analysis. Detailed separation and concentration procedure is shown in scheme #4.

#### ZONOLITE 3300

Separation and concentration techniques are similar to that of MOROKUTE, but dilute acid (in Erl) was used to digest the portland coment binds instead of using large excess of water for solubilizing plaster of Faris-The procedure is shown in scheme #5.

#### RESULTS

### A. Tremolite Content in ZONOLITE Products

ID No.	Product Description	\$ Tresolit:	<u>.</u>
1 . 2	ZIC K-4/5 B	1.715	
<u>}</u>	Masonry Fill K-1 Masonry Fill K-3	1.605 .0504	·
11 .	PK 4 Kearney 3	<0.08 <0.08	
13 17	Terra-Lite Kearney Terra-Lite T.R.	4.319 o.016	
20 21	Metro Mir 200 T.R. Redi-Earth T.R.	(as recid) 0:398 (duled (as recid) 0.048 (duled	77
23 (5). 26 27	Verxite Carrier Grade #4, Kearney (S Metro-Mix 300, T.R. Metro-Mix: 350, T.B.		) 1) 0.121 1) 0.259

Metro-Mixes and Redi-Earths were computed both in as-receivel basis and oven-dried basis since the product has substantial. smount of moisture.

Tremolite Content in ZOROLITE Products Page 3

127 Buch

E. S. Wood E. J. C. Yabs il 20, 1977

		•
		% Tremolite
1 <u>02.</u>	Product Description	< 0.10
- -		0.01
<u> 110 -</u> M	K-4 (L-3) West Chicago Hest Chicago	0.035
2 4	Fill Line	.013
<u></u>	ware-lite, " - v chicago	(as rec'd) .031 (dried) .051
.9. '/ 15	ttle Fill Age	(AS FEC CO.02
		(as reg'd)0.034 (d=1ed)<.043
20.	Red1-Earth 121 Chicken	
	16 T 200, \_'_,	1777 ·
15 12	Zonolite 3300 (III) N:	20,007 ~
3		<0.009
16	Scott Turi Bullder (L) Light	
-22	Scott Bit-	

Tresolite Content in Zenelite Job-site Samples

			Samples	d Tresoll	te .
В-	• -	in Zonalite Job-site	Ala-	0.050 2.828	)
田	No. ZK Roof D	eck (K L/5 B)	Columbus, Obio	0.033 0.100 0.400 0.400	Š
2	2 Post-Eart	F (1-3)	W. Palm Beach, Place	F12- 0.47	6 '
	Masoniy	411 (K-4).	Edison de Oklahos	98 . 0.2h	io
	Masonry Monokote	L (L-3) Mashour	Hyson	·	
	71	*oven-dried basis	•	1	

- 1. Some of the Rearney products showed high "tremplite" content since x-ray dillegent of the Rearney products showed high "tremplite" (which is a second of the restrict to th fraction method cannot distinguish massive tremplite (Hornblender) and fibress DISCUSSION and COMMENTS trecolite. Microscopically, most of the Searney material showed trace or
  - 2. Tremolite fibers can be reduced if a screened vermiculite is used such as in versite. We have observed that most of the fibers are concentrated in the fines.

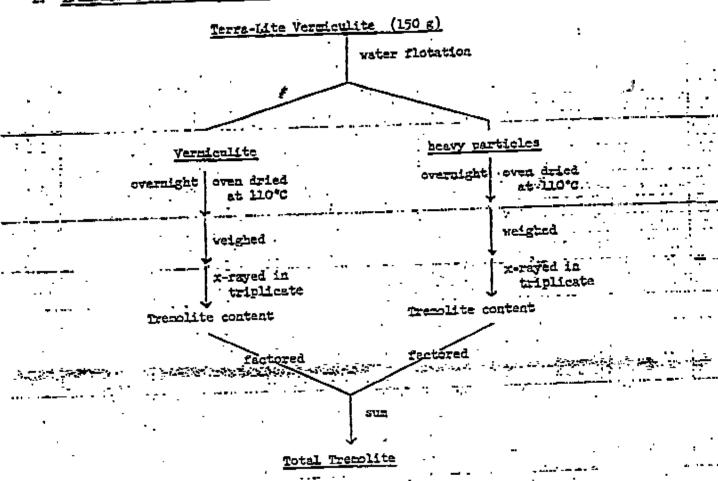
Tremplite Cintest in ZONOLITE Products Page 4

To: E. S. Wood From: J. C. Yang April 20, 1977

- 3. The percentage of tremplite in several samples was expressed in less than a certain value which indicated that tremplite fiber was not detected by cut x-ray method. The limit of detection for tremplite by x-ray diffinetion technique is about 0.2%. When concentration factors were taken into consideration, the possible maximum tremplite content in each sample was indicated in the analyses.
- 4. Most of the Monokote showed undetectable tremplite content except #57, an MK-4 product used at Hyatt Regency in Dallas, which showed a 0.24% treem.

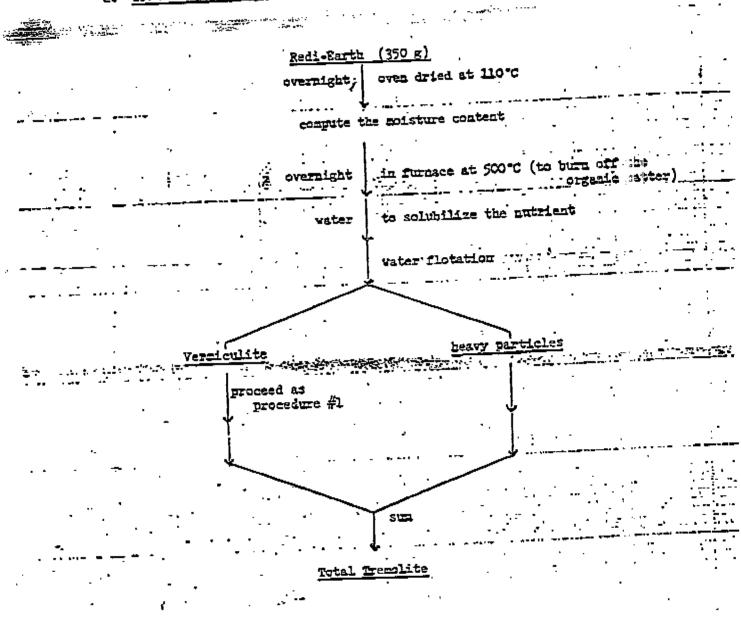
  Lite; the value has been double checked and is real.

## 1. Tresolite Determinations in Terra-Lite Verniculite

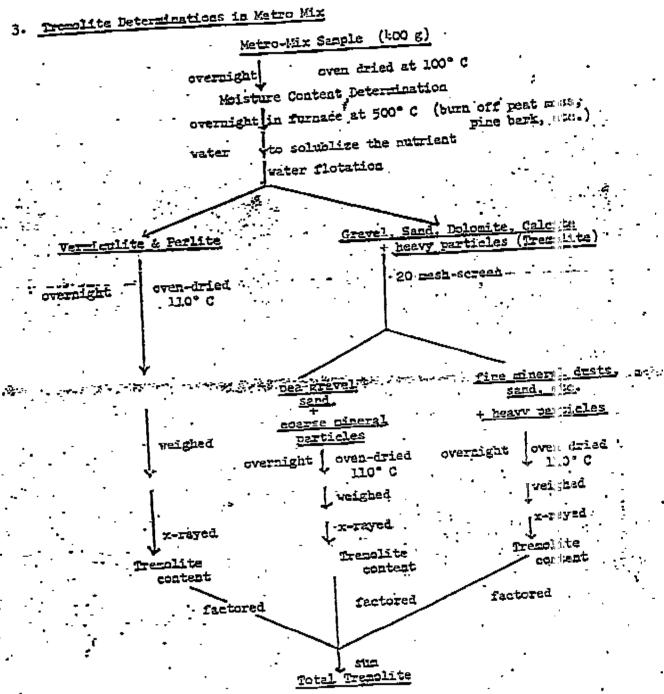


07/10/2002 04:45 PAX 043210310

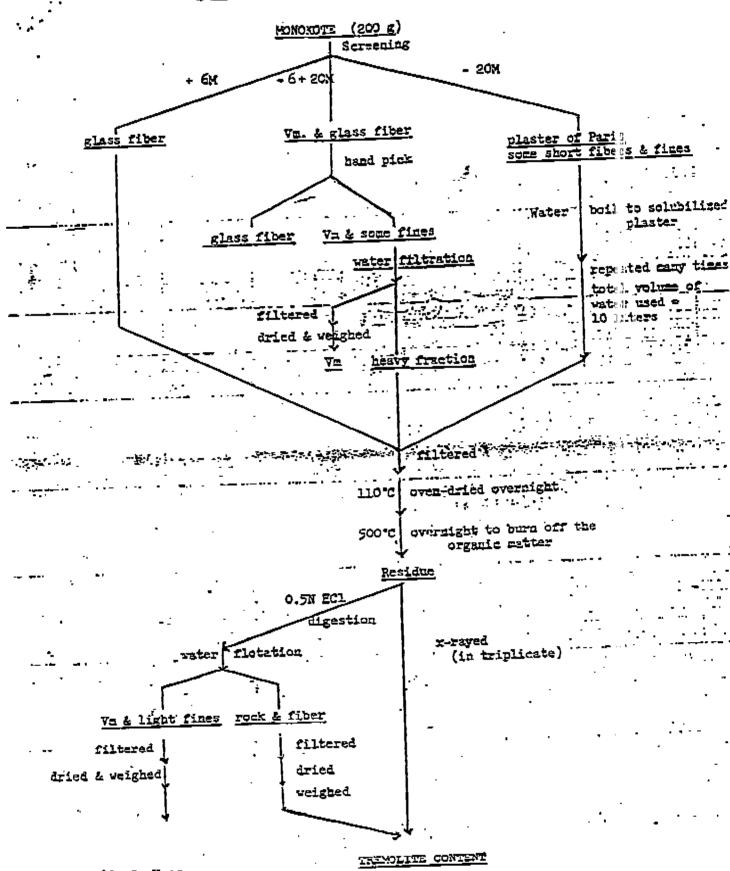
### 2. Tremolite Determination in Redi-Earth



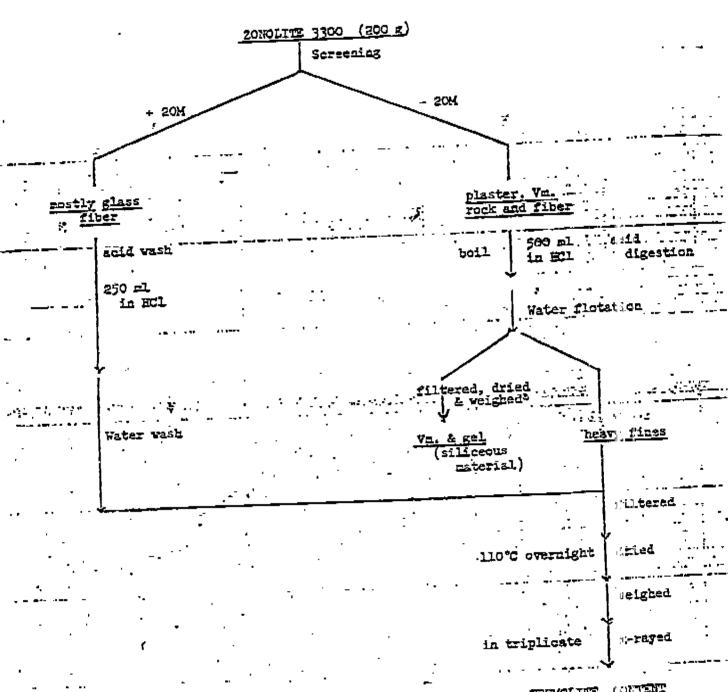
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## 4. TREMOLITE DETERMINATION IN MONOKOTE



## 5. TREMOLITE DETERMINATION IN ZONOLITE 3300



TREMOLITE

07/10/2002 04.40 PAX 0100001

# **EXHIBIT 4**

02302536

Constitution Products Division

GRACE

TO: E. S. Wood

₫. W. Wolter

B. R. Williams

W. R. Hanlon

O. M. Favorito

PROM: R. C. Ericson

co: W. F. McCord

H. C. Duecker

R. Locke

F. Eaton

DATE: April 7, 1977

SUBJECT: 2nd Draft Proposal for MSDS for Vermiculite

MSDS for Vermittees Products
Concentrate & Findshed Products

Jack Wolter and I met today with Bruce Blessington and Bill Hanlon to develop a "sales viewpoint" on my first draft proposals of April 5th. Essentially we were selecting from among the range of options proposed and editing language to take into account potential adverse impact on the business. The result into account potential adverse impact on the business. The resonant is a concensus which is attached as (5) "2nd Draft" recommendations. It is a concensus which is attached at the April 8th Fiber Committee meeting.

R. C. Exican

rce/193



LIBBY TREMOLITE STATEMENT: Contains less than to by weight of a naturally occurring contaminant tremolite. OSHA Regulation 1910.938 defines tremolite (fibrous form) as asbestos. Some forms of tremolite are platy. Other forms can be fibrillated by physical handling to release airborne "asbestos fibers". Regulation 1910.93A places a limit of 2 "asbestos fibers"/cc; 8 hour time weighted average and a maximum of 10 "asbestos fibers"/cc at any one time for airborne fiber exposure.

EXAMEN TREMOLITE STATEMENT: Contains less than by weight of a naturally occurring mixture of amphibole contaminants; hornblend and tremolite. The predominant morphology of the contaminant is platy (non-fibrous). OSHA legulation 1910.93A defines tremolite (fibrous form) as asbestos. Less than 50 of the contaminant is in a form which can be fibrillated by physical handling to release contaminant is in a form which can be fibrillated by physical handling to release airborne asbestos fibers. Regulation 1910.93A places a limit of 2 assestos airborne asbestos fibers. Regulation 1910.93A places a limit of 2 assestos fibers /ce fibers /ce; 8 hour time weighted average and a maximum of 10 asbestos fibers /ce at any one time for airborne fiber exposure.

	·	TREMOLIT	<u>e test</u>	
	* TREMOLITE TABLE BASED ON AVAILABLE	2 TODY	•	KERFINEY.
r	TREMOLITE TABLE	1-1-88-1.		.2-2-01
	MIXES	0.10		.2-2.01
	MONOXOTE	0.104		_
	ZONOLITE 3300	0.10%		_2-2.04
	Zelienza	0.104		.2-2.04
	REDI-EARTH	D*tne .		
	METERO-MIX	ter	med I	INUTE".

Per E.S. Wood, definitions above are termed "MINUTE".

Per L. D.	•	- Carlotte (
		KEARNE
<del></del>	<u>LIBBY</u>	325
TERMICALITE PRODUCTS	<u> </u>	• •
100% VERNICULITE PRODUCTS		12K
THE COURT FILL (THE BASE)	· <b>**</b>	not applicable
MASONRI (#3 mize)		DOIS OF TAXABLE
	TUKECAN T	not applicable
ATTIC FILL (\$1 size)	0.1%	
* (#2 size)		1-64
* * (67 8754)	0.14	•
(43 size)		4
	_	1-64
ZONOLITE CONCRETE AGGREGATE	0.5	not applicable
(#4 size)	0.14	DOL ALLEN
TERRA-LITE GROWER (#2 size)		1-64
TODALLITE GROWER 182 BALLY	0.14	below detectable lim
TERRA-LITE GROUPER (#3 size)		Pitton, Titres
- COMPONENT	not applicable	not applicable
VERKITE (#4 size)	<b>2</b>	
AESTITE (11 TO THE TOTAL OF THE		not a plicable
INDUSTRIAL (#1 size)	0.14	1-64
(#2 size)	0.14	<del>-</del>
		<b>7–6</b> ∜
_ (#3 size)	. 0.5%	
(#4 size)	. 0.00	
a (As pres)		
•	•	FEAR ON
•	1.1BBY	not applicable
VERMICULITE CONCENTRATE		DOC 41515-1-1-1-1
VERMICULTIF CONCE	1-4	not applicable
Size #1	. 2.5	
212C **	<u> </u>	<b>3.—</b> 6 ().
Size #2	<b>)</b> =	2-1/49
Size #3	, <b>23</b>	<del>_</del>
	<del>-</del>	<b>≇</b> :ili.
Size #4	<del>**</del> *	26:11
	· 22	
46		scopic examination of a
şize 05		scopic example to use t
<del></del>	+PP FF212 Or mran.	(WENDY FO ASC .

The 5t statement is suggested on the basis of microscopic examination of a single Kearney sample. The 5t figure is an estimate. If we intend to use t approach we would have to generate quantitative lab data by means of linear traverse.

### AIRBORNE "ASBESTOS FIBER" STATEMENT:

- Airborne fiber levels will not exceed OSHA standards in the intended end use.
- 2) The morphology of the tremplite content is predominantly platy (not fibrous). Airhorne fiber levels will not exceed OSHA standards in the intended end use.
- 3) Airborne release of the fibrous tremolite content is suppressed by a binder which is added in processing. Airborne fiber levels will not exceed 058A standards in intended end use.
- The normal physical handling given to vermiculite concentrate can consta an airborne fiber level in excess of OSEA standards. Compliance with standards can be assured by various methods: enclosure, exhaust ventilation and dust collection.
- The normal physical handling given to vermiculite concentrate can wreate a nuisance dust level in excess of OSKA standards. Due to the productionally platy (non-fibrous) character of the tremolite contaminant, the desit has 5) a negligible "asbestos fiber" (less than 0.5% by weight) fraction Normal industrial dust control practices should be followed. ...

industrial dust control Pro-	RECOVERNDED FIBER STATEMENTS
	TO ARNIAL
MIXES 10	i
HONOKOTE 1	
ZONOLITE 3300	·
REDI-EARTH GROWER	<u>-</u>
METRO-HIX GROWER	•
100% VERHICULITE PRODUCTS	<u>1</u>
VASONRY FILL (44 size)	1
(#3 size)	Consumer product
ATTIC FILL (FL ALES) /)	(Nebel Bot
<pre> (+2 ±12+) }</pre>	appropriate
* (#3 size)-	
ZOHOLITE CONCRETE AGGREGATE (64 size)1	nest applicable
TERRA-LITE GROWER (#2 BIRE)	
TERRA-LITE CONSUMER (#3 size)	ot applicable below necessary
INDUSTRIAL (#1 size)	
(#2 size)	mest be specifically described a must be particular and use practice a must be particular and use practice a must be
A (52 ETDO)	serticular end use practicular input seveloped on the basis of castomer input (modified)
- (5% 84-45)	(modified)
BULK AGRICULTURAL VERM. \$4	KEARMEY
VEPMICULITE CONCENTRATE LIBBY	- not applicable
Size #1	not applicable
Size #2	. 5
Size 43	\$ .
Size 14	5
45	5
Size #5	_

The information contained herein is based on knowledge believed to be reliable but W. R. GRACE & CO. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AS TO THE ACCURACY OR \_\_ ADEQUACY THEREOF. Nothing berein excuses the recipient hereof from such duties as thall be imposed by the Occupational Safety and Health Act of 1970 and Hegulations issued pursuant thereto.

Blessington feels that these two products need further discussion & Marification.

					4328
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forms can be fibrillat	ed ph bullareer .		1	Filesta /cats	
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a hour time weighted a one time for airborne e e1: 1.2 . e2:	fiber exposure.  2.5  ndling given to	vermiculito	concentrat	e can creat.	s an air be assu
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The information contained herein is based on knowledge believed to be reliable, but W.R. GRACE & CO. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AS TO THE ACCURACY OR ADEQUACY THEREOF. Nothing herein excuses the recipient hereof from such duties as shall be imposed by the Occupational Safety and Health Act of 1970 and regulations issued pursuant thereto.

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OTHER PRESA	*******						
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PAGE (2)

Form CSKA-20 Nov. May 72

U.S. DEPARTMENT OF LABOR Occupational Safety and Health Administration DATE B. R. Williams Required under USDL Safety and Health Regulations for Ship Repairing W. R. Manlon Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917) O. M. Paverite SECTION ( EMERGENCY TELEPHONE MO. 617-876-1400 ± 457 HANUFACTURER'S NAME W. R. Grace & Co. - Construction Products Division Quality Assurance Hanager ADDRESS (Number, Street, Gry, State, and ZLP Code) 02140 62 Whittemore Ave., Cambridge, MA EMEMICAL NAME AND SYNGHYMS TRADE NAME AND SYMPHYMS Vermiculite Concentrate Xearney N #3 £ #4".

### SECTION II - HAZARDOUS INGREDIENTS

(Mg, Ca, K) - (A1, Fe, Mg) - (S1, A1) 4 (O) 10 (OR)

The normal physical handling given to vermiculite concentrate can create 12302521 a nuisance dust level in excess of OSHA standards. Due to the predominantly platy (non-fibrous) character of the tremolite contaminant, the dust has a negligible "asbestos fiber" (least tremolite contaminant, the dust has industrial dust control practices should be followed.

SECTION III . PHYSICAL DATA edecific gravity (mg0=1) NA NA SOILING POINT (FJ PERCENT, VOLATILE ЖA VAPOR PREESURE (MM HL) ΝA EVAPORATION RATE XX. NA (JORIAN YTIZHBO ROGAY 45-65 Slight, Bulk Density 1bs/c.f. SOLUBILITY IN WATER Free flowing irregularly shaped flake - ranging in color from APPEARANCE AND DOOR gold to datk grev

SECTION IV - FI	IRE AND EXPLOSION HAZARD DATA	A NOT PPLICABLE
SECTION 14 SIL		Lei Lei
FLASH POINT (Method used)	FLAHMABLE LIMITS	
EXTINGUISHING MEDIA	•	
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UNUSUAL FIRE AND EXPLOSION MAZAROS		
DRUSUAL FIRE AND EXPENSION FRANCE		

PAGE (1)

VERMICULITE CONCENTRATE

Magnesium Aluminosilicate Minera

(Continued on reverse side)

Form OSHA-20 Nov. May 72

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ANUFACTURERY NAME W. R. Grace & Co Cons	truction Product	; Divisi	ios _	617-876-1	-	
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memical name and synonyms	OT APPLICABLE			EARTH GRO	WER	
HEMICAL FAMILY eat Moss/Vermiculite Mix		POPPUL	NOT	APPLICABLE		
	ECTION II - HAZA	ADOUS II	YONEDI	CN IS	· ·_	⊭3028Ω:
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	res in the grove	er indust	Tỳ may	the inten	ty co	iltions.

	SECTION III	- PHYSICAL DATA	
FOILING POINT (FL)	_ NA	SPECIFIC GRAVITY [H2O-1]	NA_
VAPOR PRESSURE (mm Hg.)	NA.	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DEMSITY (AIR#1)	NA.	EVAPORATION RATE	NA
SOLUBILITY IN WATER	NA.	Bulk Density 1bs/c.f.	8-10
APPEARANCE AND ODOR Slightly		colored free-flowing material	- In (4)

SECTION IV - FIRE AN	D EXPLOSION HAZARD DAT	A NOT APP	LICABLE
FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES		•	
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UNUSUAL FIRE AND EXPLOSION HAZARDS		4	

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PAGE (2)

Form OSHA-ZO

### GRACE

TO: E. S. Wood

J. W. Wolter

B. R. Williams

w. R. Hanlon

o. M. Pávorito

FROM: R. g. Ericson

SUBJECT: MSDS for Vermiculate
Concentrate & Final Shed Products

April 5, 1977

. F. McCord

H. C. Duecker

R. Locke,

P. Eaton

With more data now available, I have drafted some proposed language for Material Safety Data Sheets. My view is that we should have an MSDS for each product in the line because this permits to make more informative and precise statements.

The most difficult section to complete is Section II \*\* !AZARDOUS INGREDIENTS. This will include (1) a tremolite statement and (2) an asbestos fibers statement. I am attaching proposals for a standard pattern to follow in this section with (17) distinct finished product classifications. Also attached are (3) examples of complete MSDS for Libby concentrate, Kearney concentrate, and Redi-Earth (an example of a mixed product).

I would expect that a group discussion of these proposals could permit us to develop a concensus draft so that we can respond to numerous pending requests. As a related postscript, I would like to offer my version of a "safety" statement: "We believe our product has an ((1) acceptable or (2) negligible or (3) almost non-existent) hazard at any forseeable exposure levels in its intended and unit."

R. C. Exictor

rce/lpj. Attachments 1. LIBBY TREMOLITE STATEMENT: Contains less than \* t of a naturally occurring contaminant tremolite. OSRA Regulation 1910.93A defines tremolite (filterous contaminant tremolite. OSRA Regulation 1910.93A defines tremolite (filterous form) as asbestos. Some forms of tremolite are platy. Other forms can be fibrillated by physical handling to release airborne "asbestos fibers" longer fibrillated by physical handling to release airborne "asbestos fibers" longer than 5 micrometers. Regulation 1910.93A places a limit of 2 "asbestos fibers"/ce; than 5 micrometers. Regulation 1910.93A places a limit of 2 "asbestos fibers"/ce; than 5 micrometers and a maximum of 10 "asbestos fibers"/ce at any one time for airborne fiber exposure.

FEARNEY TREMOLITE STATEMENT: Contains less than to of a naturally encurring mixture of amphibole contaminants; Hornblend and tremolite. The predeminant morphology of the contaminant is platy (non-fibrous). OSHA Regulation 1910.93A defines tremolite (fibrous form) as asbestos. Less than 5% of the contaminant defines tremolite (fibrous form) as asbestos. Less than 5% of the contaminant is in a form which can fibrillated by physical handling to release all write is in a form which can fibrillated by physical handling to release all write as in a form which can fibrillated by physical handling to release all write as a limit of 2. "asbestos fibers"/cc; 8 hour time weighted average and a number of 10 "asbestos fibers"/cc; 8 hour time for airborne fiber exposure.

* TREMOLITE TABLE	OFFE ON	AVAILABLE	CPD TRE	MOLITE TES	T DATE
* TREMOLITE TABLE	APPLE VICE		LIBBY .		KEARHEY
MIXES		ı	0.10		.2-2. <b>0</b> %
MONOKOTE			0.10		.2-2.0%
ZONOLITE 3300			0.10%		.2-2.0%
REDI-EARTH	•		0.10%		.2-7.0%
METRO-MIX	-		4124		MANTENED FOR

Per E.S. Wood, definitions above are termed "MINUTE".

1001 VERMICULITE PRODUCTS  MASONRY FILL (#4 size)  (#3 size)  ATTIC FILL (#1 size)  (#3 size)  ZONOLITE CONCRETE AGGRETATE  (#4 size)  TERRA-LITE GROWER (#2 size)  VERXITE (#4 size)  INDUSTRIAL (#1 size)  (#3 size)  (#3 size)  (#4 size)	UNIDATE UNIDATE UNIDATE O.1% O.1% O.1% O.1% O.1% O.1% O.1% O.1%	not applicable not applicable l-6% l-6% l-6% l-6% below detectable limi not applicable not applicable 1-6% l-6% l-6% l-6% l-6% l-6%
VERMICULITE CONCENTRATE  Size #1  Size #2  Size #3  Size #4  46	1.2 2.5 2.5	mot applicable not applicable 1-64 1-104

The 5% statement is suggested on the basis of microscopic examination of & single Kearney sample. The 5% figure is an estimate. If we intend to use this engle Kearney sample to generate quantitative lab data by means of linear approach we would have to generate quantitative lab data by means of linear

TTAVEISO.

AIRBORNE "ASBESTOS FIBER" STATEMENT:

- "Airborne: fiber levels will not exceed OSHA standards in the intended end use.
- 2) The morphology of the tremolite content is predominantly platy (non-fibrous). Airborne, fiber levels will not exceed CSHA standards in the intenced end use.
- Airborne release of the fibrous translite content is suppressed by a binder which is added in processing. Airborne fiber levels will not exceed OSHA standards in intended end use.
- The pormal physical handling given to vermiculita concentrate can ereate an airborne, fiber level in excess of OSHA standards. Compliance with standards can be essured by various methods: enclosure, exhaust contilation and dust collection. See W. R. Grace & Co. bulletin #
- 5) The normal physical handling given to vermiculite concentrate can exeate a nuisance dust level in excess of OSHA standards. Due to the presiminantly platy (non-fibrous) character of the tramplite contaminant, the dest has a negligible "asbestos, fiber" fraction. Normal industrial dust control erices should be followed.

practices should be follower.	POSSIBLE FIR	ER STATEMENTS
	TIBBY	KEARNEY
MIXES	1	1, 2
HONOKOTE	ī ·	.1: 2
ZONOLITE 3300	1. 3	1; 2; I
REDI-EARTH	1, 3	1, 2, 3
METRO-MIX	<b>-1 -</b>	
100% VERMICULITE PRODUCTS	Tibel	REARNEY
MASONRY FILL (#4 size)	<del></del> 3	1: 2
# * (#3 size) -	3	· 1: 2
	المحمون المعارض الم	
ATTIC FILL (#1 size)	. 3	-
• • (\$3 size)	unknown	1; 2
ZONOLITE CONCRETE AGGREGATE	•	
(#4 site)	1	1, 2
TERRA-LITE GROWER (\$2 size)	1: 3	
TERRA-LITE CONSUMER(#3 size)	1	1, 2
VERXITE INDUSTRIAL (#1 size)	. 3	-
VERXITE INDUSTRIAL (#2 size)	3	
		1, 2
- (#3 size)	.3	1; 2
e # (#4 mize)		
-		KEARNEY
VERMICULITE CONCENTRATE	LIBBY	pot applicable
Size #1	•	not applicable
Size #2 -	•	5
Size #3	•	Š
Size #4	•	5
4G	4	Š
· Size #5	,	<b>.</b>

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MATERIAL	SAFET	Y DATA	SHEET	.J. W. 18	
	afety and Hosi Shipbreaking	th Regulations for 129 CFR, 1915, 19	Ship Repairing 16, 1917)		
	SECTIO	N I			avorito
MANUFACTURER'S NAME	·	Nation .	EMERGENCY TI 617-876-140	CLEPHONE II	· <del>···</del>
W. R. Grace & Co Construction ADDRESS (Number, Sires, City, Suite, and ZIP Code)	Products 1	)14121111	Ounlity As:		anager
62 Whittemore Avenue, Cambridge CHEMICAL NAME AND SYMONYMS VERMICULITE CONCENTRATE (Non-exp. CHEMICAL FAMILY Magnesium Aluminosilicate Mineral	ndel) #1	FORMULA Ig, Ca, K) - (A1,)	amg and synon nlite Copce Fe,Mg) - (Si.)	TMS	Libby Mine
SECTION II	- HAZARI	OUS INGREDI	ents		Frances Fran
1. TREMOLITE STATEMENT: Contains contaminant tremolite. OSHA Some forms of tremolite are handling to release airborne Regulation 1910.93A places a weighted average and a maxim airborne fiber exposura.  * 1: 1.2	platy. Ot "asbestos limit of mm of 10 " given to	her forms can fibers" long Z "asbestos fibe asbestos fibe vermiculite c s. Complianc	be fibrill er than 5 m lbers"/cc: rs"/cc at a cncentrate e with standard dust co	eted by sicromotes  B hour to  ny one to  can creas  lards cos  oliestiss	ine for 2302525 an airbor he assured
SECT	TION III - P	HYSICAL DAT	N.		
SOLUNG POINT (FF.)	NA	SPECIFIC GRAVIT	Y (H3Q-1)		NA
VAPOR PRESSURE (mm #4.)	NA .	PERCENT, VOLAT	(LE		NA
VAPOR DENSITY (AIR-1)	, NA	EVAPORATION R	17E -1}		N/A
	Slight.		33-/- ¢		45-65
APPEARANCE AND ODOR Free flowing i	diea Trédajuija	shaped flake	- tandrud		1100
SECTION IV -	FIRE AND	XPLOSION HA	ZARD DATA	NOT A	TICABLE
FLASH POINT (Method tried)		FLAMMABLE I	.illits		, Luci
EXTINGUISHING MEDIA				·	
SPECIAL FIRE FIGHTING PROCEDURES UMUSUAL FIRE AND EXPLOSION HAZARDS			. • 🛶		Tetm OSHA-20
	Continued on	TEVELET TIGG)		,	

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THRESTIOLD LIMIT	VALUE					TH HAZARD DATA		062433
Airborne asbe	stos 1	iper 21/	<u>cc T.W.</u>	٠٠	<u>- ceil</u>	ling lof/cc at on	0230	22822
Dust respirat	le fr	<u>etion 5</u>	<u> 1971, mem</u>		Total	dust 15 mom/H3.		4:
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<u> </u>		<u> </u>	<u> </u>					
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STABILITY ,	UNST			· .				
INCOMPATABILITY	STAR		<u> </u>					
	,				· <u> </u>		1.00	
HAZARDOUS CEE	DMP0517	19W - KODO				CONDITIONS TO AVOID		
HAZARDOUS		MAY OCCU		-1				
POLYMERIZATION	<u>`                                     </u>	WILL NOT	CCUR					
			<u> </u>					
	<del>-</del>					OR LEAK PROCEDI	JRES	- u ul
	·	SECT	ION VII	* 3 EZSI	ED OR S	PILLED .		
STEPS TO BE TAK Dampen S	lightl	y of use	other	cec	hniqu	s which control	airborne fibers a	nc cuse
within t	he TLV	limits	of Sect	ion	<u>V ab</u>	W\$		
		•	<u> </u>		_ •			
WASTE DISPOSAL	METHO	o Use đi	e <del>bo</del> sal '	tec	hniqu	es which control	airborne fibers a	ne clube
				<u> </u>	ove.	See OSHA Standard	1910.93%,	
Paragraph ()	(2)	Waste Di	sposal			<u> </u>		
				·		ROTECTION INFO	RMATION	
· .		SECTION	VIII - :	57 E1	· ·	WOIECIION III		, ,n —.
					. •	-		
	tion s rsonal	hall be t Prote <u>ct</u> :					exhaust ventilat: lso see CSHA Stan ork environments:	
		<del></del>						
<u> </u>			ECTION	! IY	- SP	CIAL PRECAUTIO	NS	Ţ _
PRECAUTIONS TO	O DE TA	KEN IN HAN	PLING AN					
See OSH	<u>stan</u>	<u>dard 1916</u>	<u> </u>	_		<u> </u>		n dt n
OTHER PRESAU	riches							
DIMER PRECAU					<del></del>			
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U.S. DEPARIMENT OF LABOR e. S. iiixd - acupational Safety and Health Administration J. W. Waskeer MATERIAL SAFETY DATA SHEET B. R. Dilliams Required under USOL Safety and Health Regulations for Ship Repairing Shipbuilding, and Shipbreaking (29 CFA 1915, 1916, 1917) w. R. Banlon D. M. | avorito SECTION I EMERGENSY TELEPHONE 140. MANUFACTURER'S MAHE 617-876-1400 x 4 17 W. R. Grace & Co. - Construction Products Division Quality Assurance Manager ADDRESS (Number, Street, City, State, and ZIF Code) 52 Whittemore Ave., Cambridge, HA 02140 TRADE NAME AND SYNONYMS
Vormiculite Concentrate - Kearney Line #3<u>6</u> #4 VERNICULITE CONCENTRATE (Mg,Ca,K)-(A1,Fe,Mg)-(Si,A1)4(O),10(OH),-B CHEMICAL FAMILY Magnesium Aluminosilicate Hineral SECTION II - HAZARDOUS INGREDIENTS KEARNEY TREMOLITE STATEMENT: Contains less than a of a naturally occurring mixture of amphibole contaminants; Hornblend and tremolite. 0::302530 The predominant morphology) of the contaminant is platy (non-fibrous). OSHA Regulation 1910.93A defines tremolite (filmous form) as asbestos. Less than 5% of the confaminant is in a form which can be fibrillated by physical handling to release sirborne "asbestes fibers" longer than 5 micrometers. Regulation 1910.93% places a limit of 2 "asbestos fibers"/cor 8 hour time weighted average and a maximum of 10 "asbestor fibers"/cc at any one time for mirborne fiber exposure. 43: 1-64: 44: 1-104 The normal physical handling given to vermiculity concentrate can create a nuisance dust level in excess of OSHA standards. Due to the predominant y platy (non-fibrous) character of the tremplite contaminant, the dust has a negligible "asbestos fiber" fraction. Normal industrial dust control practices should be followed. SECTION III - PHYSICAL DATA SPECIFIC GRAVITY (%20~1) NA. BOILING FOIRT (FJ NA PERCENT, VOLATILE BY VOLUME (%) NA **マスクウR PRESSURE (mm His)** NA EVAPORATION RATE NA. VAPOR DENSITY (AIR+I) MA 5light. 45-65 Free flowing irregularly shaped flake - ranging in Childr from Bulk Density 1bt/c.f. SOLUBILITY IN WATER APPEARANCE AND ODOR gold to dark grey

SECTION IV - FIRE AN	D EXPLOSION HAZARD DATA HOT REPLICABLE
FLASH FOINT (Method used)	FLAMMABLE LIMITS LSI 1001
EXTINGUISHING MEDIA	
SPECIAL FIRE FIGHTING PROCEDURES	
UNUSUAL FIRE AND EXPLOSION MAZAROS	-

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Form OSRA-20 Clark May 72

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	le fraction	<u>ingn/M³.</u>	Total d	ust 15mgm/M <sup>3</sup> .	0230	12021
<u>-</u>	-				<u> </u>	· 062434
EMERGENGY AND	FIRST AID PROCE	DURES.	<del></del>			
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		SECTIO	א VI - R	EACTIVITY DAT	NOT APPLICA!	<b>L</b> "
FTABILITY	UNSTABLE	1	CONDITION	S TO AVOID		
	STABLE		1			
INCOMPATABILITY	fileterials to evoid	7			<u>.</u> * * *** *	7
HAZARDOUS DEC	OMPOSITION PAGE	PUCTS .	<u> </u>	.,		
	MAY OCC	u*		CONDITIONS TO A		
mazardgus Polymerization	WILL NO	F OCCUR				
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		· · · · · · · · · · · · · · · · · · ·				
				OR LEAK PROCE	Dures	1.
STEPS TO BE TAK	EN IN CASE MATE	RIAL IS RE	LEASED DR	spilled which control A	rhorne dust	
within the	riv limits of	Section	avoda V			
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WASTE DISPOSAL	METHOD Use d	isposal	techniqu	es which contro	L airborne	
dust within	the TLV limi					
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	SECTIO	- וווע א	SPECIAL"	PROTECTION IN	ORMATION	
Re Ty	spiratory Pro	otestion:	. If TLV	is exceeded, us	ORMATION  disposable respi  or reusable resp	cator irator
Re Ty	spiratory Pro	rection 2. 3M #B	: If TLV 710 or si	is exceeded, us	e dispesable respi e or reusable resp	cator irstor
	spiratory Property Pr	SECTION	: If TLV 710 or si NIX - SP	is exceeded, us milar disposabl	e dispesable respi e or reusable resp	irator
	spiratory Property Pr	SECTION	: If TLV 710 or si NIX - SP	is exceeded, us milar disposabl	e dispesable respi e or reusable resp	irator
PRECAUTIONS TO	spiratory Property Pr	SECTION	: If TLV 710 or si NIX - SP	is exceeded, us milar disposabl	e dispesable respi e or reusable resp	irator

PAGE (2)

Form OSMA-29

U.S. DEPARTMENT OF LABOR Supational Safety and Health Adminis. Jon 062434 DATE: J. W. lolter B. R. illiams Required under USDL Safety and Health Regulations for Ship Repairing Shipbuilding, and Shipbresking (29 CFR 1915, 1916, 1917) W. R. Manlon O. M. Pavozito SECTION I EMERGENCY TELEPHONE HIG. 617-876-1400 x 45" MANUFACTURER & NAME W. R. Grace & Co. - Construction Products Division Quality Assurance Sanager ADDRESS (Number, Street, City, State, and ZIP Code) 62 Whittemore Avenue, Cambridge, MA 02140 TRADE MAME AND SYNONYL REDI-EARTH GRIMER CHEMICAL NAME AND SYNORYME FORMULA NOT APPLICABLE CHEMICAL FAMILY. Pest Moss/Vermiculite Mixture SECTION II - HAZARDOUS INGREDIENTS 02:102532 Contains less than 2.0% of a naturally occurring contaminant tremolitum. The morphology of the tremolite content is predominantly platy (non-filmous). Dess than 5% of the contaminant (0.1%) is in a form which can be fibrilliated by physical bandling to release airhorne \*asbestos fibers\* longer than 5 micrometers. Airborne fiber levels will not exceed OSEA standards in the intended and use. 2. Airborne release of the fibrous tremolite content is suppressed by a lainder which is added in processing. Airborne fiber levels will not exceed OSHA 3. standards in intended end use. NOTE: This section could include any of the following combinations; 1 & 2 or 1 & 3 (Kearney vermienline only)

	SECTION III	- PHYSICAL DATA	
MILING FOINT (F)	1472	SPECIFIC GRAVITY (H20-1)	AM
		PERCENT, VOLATILE	NA
VAPOR PRESSURE (mm ML)		EVAPORATION RATE	NA_
VAPOR DENSITY (AIR+1)	NA.		
SOLUBILITY IN WATER	NZA	Bulk Density lbs/c.f. colored free-flowing material	B-10

SECTION IV - FIRE A	AND EXPLOSION HAZARD DAT	A HOT JUFL	ICABLE
FLASH POINT (Method used)	PLAMMABLE LIMITS		
EXTINGUISHING MEDIA			<del></del> _
SPECIAL FIRE FIGHTING PROCEDURES			
UMUSUAL FIRE AND EXPLOSION HAZARDS			· · · · · · · · · · · · · · · · · · ·
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ABILITY	UNSTA	<b>SLE</b>	· .	CON	DITIONS	TO AVOI	<u></u>				
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COMPATABILITY											n
ZARDOUS DEC	DMPOSIT	ON PRODU	¢TS			<del>*</del>		Voin			<del></del>
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							レロロへぐり	EDUBES	#317FF		متعد دار
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TEPS TO BE TAK	בא וא כי	SECT	TION VI	11 - S	SPILL (	OR LEA	K PROCI	EDURES	NOT	AFFIAL	
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		ise mater	AL IS RE	II - S	ED OR 5	OR LEA	K PROCI	EDURES	NOT	AFFILL	7
		ise mater	AL IS RE	11 - 5	ED OR 5	PILLED	K PROCI	EDURES	NOT		
	METHO	GE MATER	IAL IS RE		ED OR S	PILLED					
ASTE DISPOSAL	METHO	SECTION	VIII •		ED OR S	PILLED					77.1CABLE
	METHO	SECTION	VIII •		ED OR S	PILLED		IFORMA	TION		
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ASTE DISPOSAL	ROTECTI	SECTION	VIII •		ED OR S	PROTEC	TION IN	FORMA SPECIAL OTHER	TION		
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PASTE DISPOSAL RESPIRATORY P VENTILATION PAGTECTIVE CL	ROTECTI LOC MEC	SECTION ON (Specify AL EXHAUS HANICAL (G	VIII ·	SPE	CIAL F	PROTEC	TION IN	SPECIAL OTHER	TION		
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Form OSHA-20

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Horseve & that the the second on Pientouit contit . Low. (12302835 Jan Down to the total total to the total tot believe the beamer to present trouble and out contit is he that the gh owner of the late It anderton file when the mile in will the desired answerl to be then The touch orbits file on what ord out contin may be punt sim they! It perout by may to a so some occurry a proces deleted in COSHA stull 1710.1001 17 et

the orbita to 1 /3/1 1001 in (c) I not the not menter a same for them, one of the of the state of the the state of the state of the total the state of the stat the timber should be promised mule to the storland to # sin from the time probated & Smith Combin which aborder to a file of tould ortation antest. Just your states the "the dust has a might negligible ? ashets film " ( .... the 0.5% by must ) funter. " - - seem confusing. Co inheated of a 0.5 % the the Jil cutil the significant my now here Julie orbeitaform anter of the Many one so en H 0.57. 9 myst the smed to more occument of theme sichertell afore I de set seemed state to micher to the present of a state of the selection to present of the selection to present of the selection to the sele

(d) of suggest that H.A. Sent Le addres to EPD's MIDS

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